

Rivers&Streams



The Crayfish Connection

Rivers and streams make good homes for **crayfish**. Crayfish live under rocks and old sunken logs. They show us the importance of rivers and streams.

Crayfish are a link in stream **food chains**. They eat many kinds of plants and animals. Using their mouth and claws, they tear up dead plants and animals. Crayfish help break down food so other plants and animals can get nutrients.

Crayfish are food for many other animals. Fish, snakes and turtles all eat crayfish. Birds and raccoons like them, too. All these animals need clean streams and rivers to survive.



(see page 2)

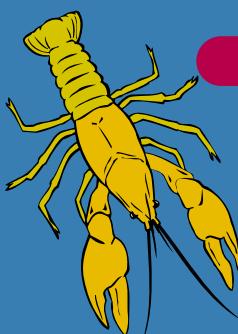
Healthy Rivers and Streams



Rivers and streams need many things to stay healthy. Plants, animals and people affect water quality. Rain and soil can change a stream, too. If any part of the stream is not healthy, it will affect the rest of the stream. What can you do to keep your Missouri streams healthy?

Streams contain many parts. **Floodplains** are areas around the stream that hold overflowing waters or floods. A **riparian** (rye-PEAR-e-an) area is the land with trees along a stream **bank**. A **watershed** includes all of the land that brings rainwater to a stream. The part of the stream that has flowing water is called the **channel**.

What harms Missouri streams? **Pollution** hurts stream life. Erosion and bulldozing hurt streams. How can we protect the homes of stream plants and animals?



Story continued from cover

People use crayfish. People in the United States eat 53 metric tons of crayfish each year. Crayfish are also used for fish bait. Crayfish help us understand why clean streams and rivers are important to people.

Missouri has many kinds of crayfish. This is because we have many types of stream **habitats**. Some crayfish need clear water with **riffles** to live. Other crayfish like muddy water with deep pools. The physical and chemical qualities of streams are important to all living things, including crayfish.



This great blue heron is hunting for crayfish.

Animals and Plants

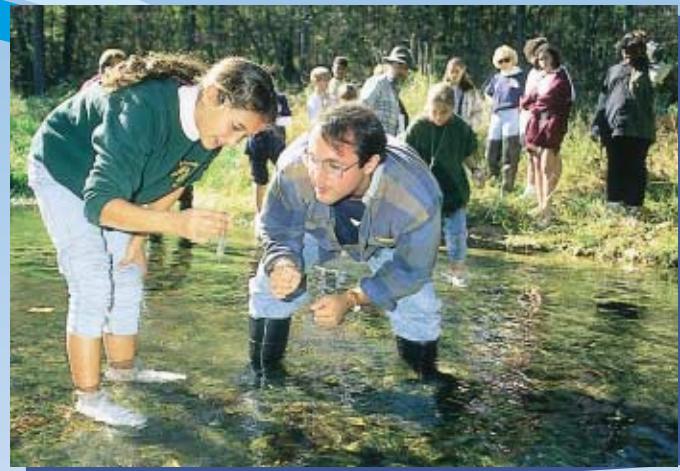
Where can you find thousands of plants and animals? There are many good answers, but did you include streams? Plants and animals can be found in all parts of streams.

Plants and animals need water just like people. Some plants and animals live IN streams. Others live on the land AROUND streams. Streams make good habitat. Animals can find **food** and shelter. Also, a stream makes a good **nursery** for young animals.

Some animals and plants **adapt** to live in the stream. Fish bodies are shaped for where they live. Mammals have oily fur. The river otter's oily fur keeps water off its skin. Some birds like the heron have long legs. This helps them wade and fish.

River Parts

- Floodplain
- Riparian area
- Stream bank
- Stream bed
- Channel



Enjoy our streams, but be sure an adult is nearby.

People Need Streams

People enjoy clean streams. People use them for fresh water. Some foods come from streams. Rivers are great for transportation. People also like streams for fun and **recreation**.

Have you ever been fishing? Fishing can provide food for families. Some people fish for the fun of it. Streams are great places to fish.

Boats have been used for **transportation** for many years. They can carry **cargo** or people. Traveling by boat used to be more common than riding in a car. Rivers are still used to transport goods.

Listing all the fun you can have with streams would make a long list! People like to water ski and swim. Boating and fishing are fun. Keeping streams clean is good for recreation.

Point of View

Let's see what they said:

"If they are bigger than 6 inches, then I keep them. If they are little, it would be harder to cook them and there wouldn't be much meat."

Jonathan Durham, Grade 4, Clearview Elementary, Washington

"I release them. I just like the fun of fishing." Jerrica Conrad, Grade 4, Clarence Lawson Elementary, Jefferson City



Students who fish were asked whether they keep the fish or practice catch-and-release fishing.



Here's what our expert had to say:

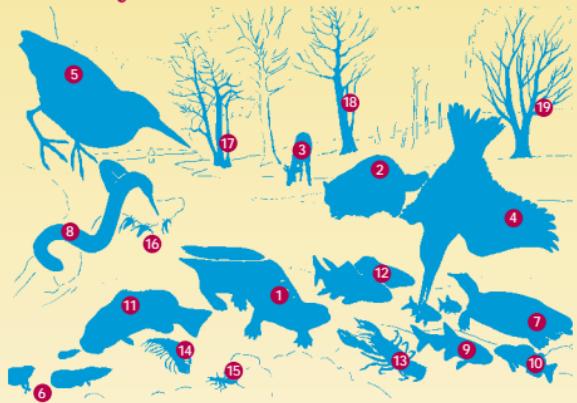
"Should you keep fish or not? This is how I would make that choice. Decide if you like to eat fish. If you like to eat fish, you can choose to keep fish. If you don't like to eat fish, but you enjoy fishing, it would be wise to return them to be caught again." Willie Lyles, Outdoor Skills Education Specialist, Department of Conservation





David Bessinger

Poster Key



1 River Otter	8 Northern Water Snake	15 Stonefly Nymph *
2 Raccoon	9 Bleeding Shiners	16 Mayfly *
3 White-tailed Deer	10 Rainbow Darter *	17 Black Willow
4 Kingfisher	11 Smallmouth Bass *	18 Sycamore
5 Little Green Heron	12 Redhorse Suckers	19 Cottonwood
6 Bullfrog Tadpoles	13 Golden Crayfish *	
7 Softshell Turtle	14 Hellgrammite or Dobsonfly Larva *	

* Clean Stream Animals

Waterlogged Jokes

Q: Where do fish keep their money?

A: In the stream bank.

Q: What kind of rock can fly?

A: A stonefly.

Q: What TV station do frogs watch?

A: The stream channel.



Watching Stream Life

Winter

December ❄ January ❄ February ❄

- Thousands of bald eagles fish in rivers and lakes
- River otters leave belly tracks in the snow
- Barred owls call at dusk—*Who-cooks-for-you-who-cooks-for-you-all*
- Osprey fly over and look white from below



Make it at Home

Dipnet and Water Viewer

Materials needed:



heavy tape



wire coat hanger



clear plastic jar
(½-gallon size)



nylon stocking



Bend the coat hanger into a square. Bend the hook end together. Wrap the hook end with heavy tape for a handle.



Tape or staple the stocking around the hanger. Now you have a dipnet to catch and see water critters!

Push the empty jar underwater to see fish and other animals swim by.



Spring

March ❄ April ❄ May

- Frogs call on warm nights
- Water birds migrate through, first are the geese and ducks, then shorebirds
- Cottonwood and willow trees bloom
- Streams flood from spring rains



The FUN PAGE

Web Sites

- 1 Missouri Department of Conservation
<http://www.conservation.state.mo.us/>
- 2 Missouri Ozarks Stream Page
<http://www.ozark-streams.com/>
- 3 Jay's Missouri Fly Fishing Page
<http://www.umr.edu/~jhoskins/>
- 4 Missouri StreamTeam
<http://www.rollanet.org/~streams>

Water Words

Q V S B S B C R O H S N R W N
S B H D A H S I P N W O E A O
O M O A A N T P I F I I T T I
C O J N B Z K A J D G T A E T
F V N S Y I L R J X L A W R U
Z E W U X P T I S Q Y T G S L
L F O O D C H A I N S R F H L
T D G O T O M N T G T O Z E O
Q F O C R A Y F I S H P J D P
W L Y R E S R U N I K S A S G
F N O I T A E R C E R N G D I
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B G F L K C B T G Q M R W I L
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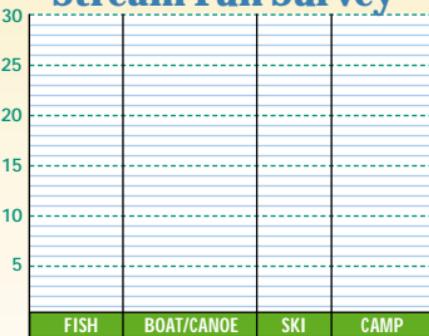
Look for the 17 words shown in **bold**. Can you find them all?

Habitat Laughs



When fish dream in their river beds

Stream Fun Survey



Find out how your class has fun in streams. What stream activities do your classmates enjoy? As the teacher calls out each event, raise your hand if you participate in that activity. Create a bar graph to show how many students in your class fish, boat or canoe, water ski and camp.

Summer

June ☀ July ☀ August ☀

- Snakes and turtles are sunning on logs
- Young fish hatch and leave nests
- Wood ducks nest in hollow trees near water
- Watch for bats at night catching insects near streams



Autumn

September ☁ October ☁ November ☁

- Turtle eggs hatch
- Leaves turn and fall, providing food in the stream
- Dragonflies emerge
- Spiders hatch, watch for them "ballooning"

A Job Upstream

Here's what Stream Biologists Sherry Fischer, Paul Calvert and Bill Turner have to say about their jobs helping Missouri streams.

What is it that you do?

"I work with Stream Teams, landowners and land managers to help improve and protect Missouri streams. Stream Teams are volunteers who adopt streams."

What's the most fun part of your job?

"Working outside with natural resources and creating new parts of our programs are the best. I loved playing in the creek when I was young and I still do!"

Do you spend all of your time in streams?

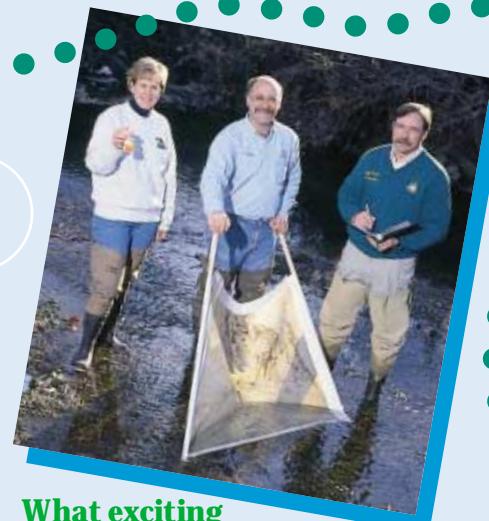
"No, I also spend a lot of time in the office creating workshops and materials. I write letters and answer questions on the phone."

We have really good streams here in Missouri, don't we?

"Most of our streams are in pretty good shape. We do have some areas where we need to make improvements. I try to help volunteers and other land managers accomplish that goal."

When you talk to lots of people, do you get nervous?

"Of course, doesn't everyone? The nice thing is that the more you talk to groups, the easier it gets! Also, you have to remember that you know your job better than anybody else. You're the expert!"



What exciting things do you see happen?

"I love to see Stream Team volunteers accomplishing cool things on their streams. Anyone can be a Stream Team. You can pick up trash, plant trees, monitor water quality and lots more. We have many classrooms that have formed Teams. If you're interested, you can call us at 1-800-781-1989. Or check out our web site at <<http://www.rollanet.org/~streams/>>."

Bennett Spring

Bennett Spring State Park is a great place for families.

The park is near Lebanon, Mo. Each day, 100 million gallons of **water** flow from Bennett Spring. It is Missouri's third largest spring.

People have come to see it for hundreds of years. Native Americans called it "Eye of the Sacred One."

The spring was used in the 1850s to run mills. The mills ground grain into meal and flour. One miller, named Peter Bennett, gave food to hungry neighbors during the Civil War. Later, farmers came and camped near the spring. They would fish and boat while their grain was ground at the mill.

The State of Missouri bought Bennett Spring in 1924. Trout from the Bennett Spring Hatchery are put in the stream from March 1 to October 31. Fishing and canoeing are very popular.

Visit the nature center to learn more about streams. One display shows the animals that live in streams. You can hike miles of trails. Wildflowers are pretty in spring. Bald eagles gather here in the winter. Watch for deer and wild turkey, too.

Families can enjoy Bennett Spring throughout the year! You can write to Bennett Spring State Park, Lebanon MO 65536 for information.



Look for me inside!



Did you know

Plants and animals

- River otters can grow up to 1.3 m (50 inches) from head to tail and weigh as much as 20 kg (50 pounds).
- Bullfrogs eat anything that they can swallow. They can eat other frogs, small birds and mice. Mmm!

Physical

- Only about one-half of 1 percent of the Earth's water is fresh water to use.
- The chert rocks that cover many stream beds were used by Native Americans to make arrowheads and tools. Settlers used flint to fire their flintlock rifles.

Society

- Recreational boaters leave 421,371 tons of litter in our waterways each year. Yuck!
- Rinse and brush works! You will save 2 gallons of water each time you brush your teeth if you turn off the water while brushing.